CLAIMS

1) A foldable frame (100) for a tricycle (1000) powered by physical force and/or a motor, the frame (100) comprising a number of subframes interconnected to fold the component members of said frame (100); and the frame (100) being characterized in that, by folding a central subframe (10) by exerting a force on it, two lateral subframes (30) supporting the rear lateral wheels (W1) are folded from a first fully unfolded configuration to a second fully folded configuration; and, conversely, by unfolding the central subframe (10), the lateral subframes (30) are also unfolded.

2) A frame (100) as claimed in Claim 1, characterized in that said central subframe (10) is substantially in the form of an articulated quadrilateral.

3) A frame (100) as claimed in Claim 1, characterized in that each of said two lateral subframes (30) is substantially in the form of an articulated quadrilateral.

4) A frame (100) as claimed in Claim 1, characterized in that each of said two lateral subframes (30) is connected functionally to said central subframe (10) by a first mechanism (80), so that deformation of said central subframe (10) is unequivocally related to that of said two lateral subframes (30), and each configuration of said central subframe (10) corresponds

to one, and only one, configuration of said two lateral subframes (30); in particular, when said central subframe (10) is deformed into a fully unfolded configuration corresponding to a running configuration of said tricycle (1000), said two lateral subframes (30) assume the fully unfolded configuration corresponding to the running configuration of the tricycle (1000); whereas, conversely, when the central subframe (10) is deformed into a fully folded configuration, the two lateral subframes (30) are collapsed against the central subframe (10) into a minimum-size configuration of the tricycle (1000).

5) A frame (100) as claimed in Claim 4, characterized in that, for each rear lateral wheel (W1), said first mechanism (80) comprises a first connecting rod (81) connected at one end by an articulated joint (G2) to a member (15) of said central subframe (10), and at the other end by another articulated joint (G1) to a member (33) of the respective lateral subframe (30), so that the movements of the first connecting rod (81) induced by rotation of the member (15) of the central subframe (10) produce corresponding deformations of the respective lateral subframe (30).

6) A frame (100) as claimed in Claim 1, characterized in that the central subframe (10) is moved from the fully unfolded to the fully folded configuration and vice versa by applying a force (F2) on a member (15) of said central subframe (10).

7) A frame (100) as claimed in Claim 6, characterized in that said force (F2) is applied on a member (16) projecting from said member (15) of said central subframe (10).

8) A frame (100) as claimed in Claim 1, characterized in that the central subframe (10) is moved from the fully unfolded to the fully folded configuration and vice versa by deforming a first subframe (20) connected functionally to said central subframe (10) by a second connecting rod (70).

9) A frame (100) as claimed in Claim 8, characterized in that said first subframe (20) is deformed by moving a seat (S) connected to it.

10) A frame (100) as claimed in Claim 1, characterized in that the central subframe (10) is moved from the fully unfolded to the fully folded configuration and vice versa by means of actuating means (60) acting between two members (11, 15) of said central subframe (10).

11) A frame (100) as claimed in Claim 10, characterized in that said actuating means (60) are hinged by a hinge (C27) to one (11) of said two members, and by a hinge (C28) to the other (15) of said two members, so that each extension of the actuating means (60) corresponds to one, and only one, configuration of the central subframe (10); more specifically, when extended, said actuating means (60) brace the central subframe (10) in the fully unfolded configuration

corresponding to the running configuration of the tricycle, whereas, when withdrawn, said actuating means (60) brace the central subframe (10) in the fully folded configuration corresponding to the minimum-size configuration of the tricycle (1000); said variations in the position of the central subframe (10) producing corresponding variations in the position of the subframes (20, 30) and folding members connected to it.

12) A frame (100) as claimed in Claim 10, characterized in that said actuating means (60) are electric.

13) A frame (100) as claimed in Claim 1, characterized by also comprising a second mechanism (90) for lifting said two rear lateral wheels (W1) off the ground during the folding operations; said second mechanism (90) comprising a member (91) hinged by a hinge (C15) to a first member (13) of said central subframe (10), and hinged by a hinge (C16) to one end of a third connecting rod (17), the other end of which is hinged by a hinge (C17) to a second member (15) of said central subframe (10), so that, as said central subframe (10) is being folded to reduce its size, rotation of its second member (15) with respect to its first member (13) moves the third connecting rod (17) so as to rotate said member (91) of said second mechanism about a hinge (C15) with respect to the first member (13), so that a free end (91a) of said member of said second mechanism is lowered onto the ground to lift the rear of the frame

(100) of the tricycle (1000), and therefore the two rear lateral wheels (W1), and so assist movement of the two rear lateral wheels towards the central subframe (10).

14) A frame (100) as claimed in Claim 1, the frame (100) comprising a seat (S) having a seat portion (18) and a backrest (19) hinged to each other by a hinge (C18); said backrest (19) being foldable onto the seat portion (18); and the frame (100) being characterized by comprising a third mechanism (25) for automatically so folding said backrest (19) when the subframes defining the frame (100) are deformed to reduce their size; said third mechanism (25) also raising the backrest (19) into the as-used configuration when said subframes are unfolded in the running configuration of the tricycle (1000).

15) A frame (100) as claimed in Claim 14, characterized in that said third mechanism (25) comprises a second subframe (40) substantially in the form of an articulated quadrilateral comprising a first member (41) integral with a member (24) of the first subframe (20), a second member (43) integral with said seat portion (18), a third member (44) opposite the second member (43), and a fourth member (42) to which is connected by a hinge (C23) one end of a fourth connecting rod (26), the other end of which is connected by a hinge (C24) to said backrest (19) of said seat (S), so that, when the subframes defining the frame (100) are deformed to reduce their size, the consequent

deformation of the second subframe (40) and the consequent relative movement of the fourth connecting rod (26) rotate the backrest (19) about its hinge (C18), so that said backrest (19) rests on the seat portion (18) to reduce the height of the tricycle (1000), whereas, conversely, when the subframes defining the frame (100) are extended into the running configuration of the tricycle (1000), said third mechanism (25) rotates the backrest (19) about its hinge (C18) into an as-used position substantially perpendicular to the seat portion (18).

16) A frame (100) as claimed in Claim 15, characterized by comprising, on each of the two sides of the seat portion (18), an extension member (27) for automatically widening the seat portion (18) when the backrest (19) is in the erect running configuration, and which folds into a minimum-size configuration when said backrest (19) is folded into the minimum-size configuration resting on the seat portion (18).

17) A frame (100) as claimed in Claim 16, characterized in that each extension member (27) is hinged to one side of said seat portion (18) by a hinge (C25) having a substantially horizontal axis of rotation; each extension member (27) being connected to the corresponding side of the backrest (19) by a retaining member (28), one end of which is connected by a first articulated endpiece (SN1) to the extension member (27), and the other end of which is connected by

a second articulated endpiece (SN2) to the corresponding side of the backrest (19), so that, when the backrest (19) is in the erect running configuration, the two retaining members (28) retain the extension members (27) in an open configuration substantially coplanar with the seat portion (18), whereas, when the backrest (19) is lowered onto the seat portion (18), the consequent movement of the two retaining members (28) allows the extension members (27) to rotate downwards, so that their transverse dimension is substantially zero.

18) A frame (100) as claimed in Claim 1, and also comprising two footrests (12) arranged specularly with respect to a longitudinal plane (a) of symmetry of the tricycle (1000); each footrest (12) being hinged to a respective arm of a member (11) of the central subframe (10) by a hinge (C26) having a substantially horizontal axis of rotation parallel to said longitudinal plane (a) of symmetry of the tricycle (1000); and the frame (100) being characterized by comprising reducing means (35, 36) for reducing the transverse dimension of said footrests (12) when the frame (100) of the tricycle (1000) is deformed into the minimum-size configuration.

19) A frame (100) as claimed in Claim 18, wherein said reducing means (35, 36) comprise a projection (35) integral with a member (32) of each said lateral subframe (30), and an inclined surface (36) forming part of each said footrest (12), so that, when the central subframe (10) is deformed and each lateral subframe (30)

relative to each rear lateral wheel (W1) is deformed into the minimum-size configuration, each of said projections (35) slides against the relative said inclined surface (36) to force the relative footrest (12) to rotate upwards about its hinge (C26) into a minimum-width configuration; whereas, conversely, when each lateral subframe (30) is restored to the unfolded running configuration of the tricycle (1000), the relative footrest (12) returns by force of gravity into an unfolded as-used configuration.

20) A frame (100) as claimed in Claim 1, the frame (100) comprising a front assembly (50) in turn comprising a front fork (51) supporting the front wheel (W2); said front fork (51) being hinged by a first hinge (C29) to a connecting member (55) integral with a sleeve (53) rotating about an axis of rotation (b) inside a steering tube (54) integral with a member (11) of the central subframe (10); said front assembly (50) also comprising a handlebar (52) hinged by a second hinge (C30) to the connecting member (55); said front assembly (50) also comprising at least one fifth connecting rod (57) hinged at a first end by a third hinge (C31) to the front fork (51), and at a second end by a fourth hinge (C32) to the handlebar (52), so that, when the handlebar (52) is rotated downwards about the second hinge (C30), the consequent movement of the fifth connecting rod (57) rotates the front fork (51) rearwards (direction D) about the first hinge (C29), and, conversely, when the

handlebar (52) is raised into the running configuration, the front fork (51) is also rotated frontwards (opposite direction to direction D) into the running configuration; said frame (100) being characterized in that said first (C29) and second (C30) hinge have axes of rotation parallel to each other and perpendicular to the longitudinal plane (a) of symmetry of the front wheel (W2), so that, when the handlebar (52) is rotated about the second hinge (C30) in the longitudinal plane (a) of symmetry, the front fork (51) also rotates about the first hinge (C29), while maintaining its own longitudinal plane of symmetry coincident with the longitudinal plane (a) of symmetry of the frame (100).

21) A frame (100) as claimed in Claim 20, and also comprising a hook (61) which rotates with respect to a portion (55a) of said connecting member (55) about an axis (c) substantially parallel to the axis of rotation (b) of the sleeve (53); said frame (100) being characterized in that the arc of rotation of said hook (61) is defined at one end by a first stop member (62) integral with said portion (55a) of the connecting member (55), and at the other end by a second stop member (63) also integral with said portion (55a) of the connecting member; the first of these two limit positions corresponding to a configuration in which the hook (61) locks the handlebar (52) in the running configuration, and the second of these two limit positions corresponding to a configuration allowing the

handlebar (52) to rotate about said second hinge (C30); elastic means (64) being provided to control the position of the hook (61); said elastic means (64) being connected at one end to a projection (66) of said portion (55a) of the connecting member (55), and at the other end to a projection (65) of the hook (61); the two projections (66, 65) being so located with respect to the axis of rotation (c) of the hook (61) as to only allow the hook (61) to assume stable configurations corresponding to said two limit positions.

22) A frame (100) as claimed in Claim 21, characterized by comprising a mechanism whereby, when the hook (61) is set to the position allowing rotation of the handlebar (52) about said second hinge (C30), the connecting member (55) and the front fork (51) fitted to the connecting member are locked in a compulsory configuration.

23) A frame (100) as claimed in Claim 22, characterized in that said mechanism comprises said projection (65) of the hook (61), and a seat (67) formed on the steering tube (54); the projection and the seat being so located that, when the hook (61) is set to the position allowing rotation of the handlebar (52) about said second hinge (C30), the projection (65) engages the seat (67) to prevent the connecting member (55), and consequently the front fork (51), from rotating about the axis (b) of rotation of the sleeve.

24) A frame (100) as claimed in Claim 23,

characterized in that said seat (67) is so located on the steering tube (54) that the connecting member (55) is locked in such a position that the axis of the first hinge (C29) of the front fork (51) is perpendicular to the longitudinal plane (a) of symmetry of the frame (100), so that, when the handlebar (52) is rotated about the second hinge (C30) from the running to the minimum-size configuration, the front fork (51) rotates about the first hinge (C29) while maintaining its own longitudinal plane of symmetry coincident with the longitudinal plane (a) of symmetry of the frame (100), thus inserting the front wheel (W2) between the two arms defining the front portion (11a) of a member (11) of the central subframe (10).

25) A frame (100) as claimed in Claim 21, characterized in that, when set to the position locking the handlebar (52) in the running configuration, the hook (61) simultaneously presses a switch (69a) forming part of a safety device (68) and which cuts off an electric circuit powering a linear actuator (60), thus preventing operation of the linear actuator.

26) A frame (100) as claimed in Claim 21, the frame (100) also comprising an electric drive motor (M); and the frame (100) being characterized in that, when the hook (61) is set to the position allowing rotation of the handlebar (52) about the second hinge (C30), the hook (61) simultaneously presses a switch (69b) also forming part of the safety device (68) and which cuts

off an electric circuit powering said drive motor (M) of the tricycle (1000), thus preventing operation of the drive motor.

27) A foldable tricycle (1000), characterized by comprising a frame (100) as claimed in Claim 1.